U.S. DEPARTMENT OF COMMERCE
National Technical Information Service

PB-258 790-T

Aromatic Hydrocarbons in Generator Shale Resin

Environmental Protection Agency, Research Triangle Park, N C

1971

300060

PB 258 790-T

EPA-TR 76-80

AROMATIC HYDROCARBONS IN GENERATOR SHALE RESIN

(Aromaticheskiye uglevodorody v generatornoy slantsevoy smole)

Lil'ya Lakhe and O. Eyzen

Izvestiya Akademii Nauk Estonskoy SSR, Vol. 20
Khimiya — Geologiya, No. 4, 1971
pp. 315-317

Translated for EPA by
SCITRAN (SCIENTIFIC TRANSLATION SERVICE)
SANTA BARBARA, CALIFORNIA

REPRODUCED BY
NATIONAL TECHNICAL
INFORMATION SERVICE
U. S. DEPARTMENT OF COMMERCE
SPRINGFIELD, VA. 22161

BIBLIOGRAPHIC DATA SHEET	1. Report No. EPATR 76-80	2.	3. Recipient's Accession No.
4. Title and Subtitle Aromatic Hydrocarbons in generator shale resin.			5. Report Date 1971 6.
7. Author(s) Lilya Lakhe and O.Eyzen			8. Performing Organization Rept. No.
9. Performing Organization Name and Address Translated from the Russian by the EPA.			10. Project/Task/Work Unit No. 11. Contract/Grant No.
12. Sponsoring Organization Name and Address EPAISD- Translations Section, Research Triangle Park,N.C.27711			13. Type of Report & Period Covered 14.

15. Supplementary Notes

Izvestiya Akademii Nauk Estonskoy SSR,Vol.20,Khimiya-Geologiya, no.4,1971,pp.315-317.

16. Abstracts

17. Key Words and Document Analysis. 17a. Descriptors

EPAISD

17b. Identifiers/Open-Ended Terms

Aromatic hydrocarbons
Generator resin
adsorption chromatography.

17c. COSATI Field Group 07C 97A

PRICES SUBJECT TO CHANGE

18. Availability Statement	19. Security Class (This Report)	21. No. of Pages
THIS TRANSLATION WAS MADE FROM A NON-COPYRIGHTED TEXT.	UNCLASSIFIED	5
	20. Security Class (This Page) UNCLASSIFIED	22. Price 3.50 - 3.00

AROMATIC HYDROCARBONS IN GENERATOR SHALE RESIN

by

Lil'ya Lakhe and O. Eyzen

The group composition and content of aromatic hydrocarbons of generator resin which boil at temperatures above 300°C have been determined previously [1, 2]. Aromatic hydrocarbons of this resin have been analyzed in more detail in work [3].

In the present work we have studied aromatic hydrocarbons extracted from generator resin by the adsorption chromatographic method of elution in silicagel columns.

The group composition of the initial resin, according to adsorption chromatography data, is as follows:

hydrocarbons	percent by weight
paraffins	5.7
olefins	3.8
aromatic hydrocarbons	22.2
nitrous compounds	0.5
oxygen-containing compounds	67.8

Fractions which boil between 191 and 300° have been analyzed by reaction gas chromatography in Pt-catalyst. Gas-liquid chromatography in a nonpolar column with a liquid phase of apiezon L for wide fractions, boiling over 400°, does not always give satisfactory separation. High-boiling fractions were analyzed by thin layer chromatography according to a previously developed method [4]. Additional identification of individual components was conducted by spectral analysis in ultraviolet.

The composition of fractions of aromatic compounds of generator resin is given in Fig. 1 and in the table.

As these results show, the content of olefin hydrocarbons, unseparated from aromatics, is reduced with transfer to higher boiling fractions. The content of oxygen compounds in fractions of aromatics is approximately constant.

A large fraction of trinuclear compounds is found in aromatic structures in generator resin. Thin-layer analysis of the complex mixture of resin frac-

tions of aromatic compounds shows slight increased mobility of compounds with condensed nuclei, caused by recripocal dissolution of individual components. This is evidently caused by the slightly increased content of the fraction of trinuclear structures due to heavier compounds. It was possible to separate

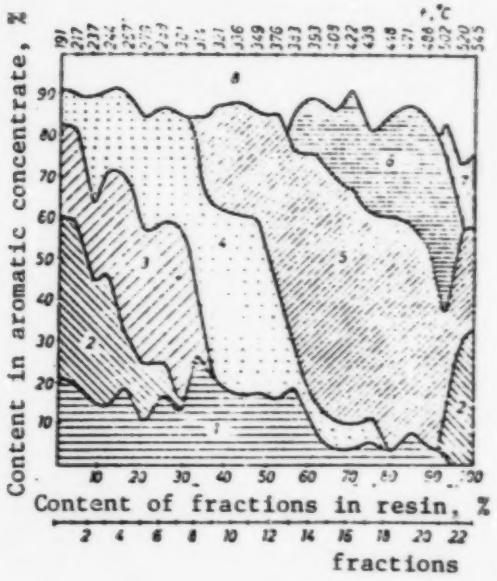

Figure 1. Composition of fractions of aromatic hydrocarbons of generator resin

1 — olefins, 2 — benzene derivatives, 3 — indane derivatives, 4 — binuclear, 5 — trinuclear, 6 — tetranuclear and 7 — pentanuclear aromatics, 8 — oxygen-containing compounds

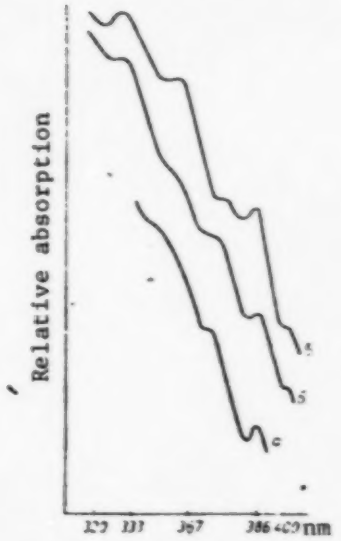

Figure 2. Spectra (a, b, c) of condensed hydrocarbons of the chrysene and 1,2-benzanthracene type, separated respectively from fractions 14, 22 and 23.

individual components with typical spectra only after repeated purification of thin-layer fractions by depositing them either on a new thin layer or on chromatographic paper.

Several spectra of tetranuclear compounds of the chrysene and 1,2-benzanthracene type, extracted after additional purification of the fractions, are given in Fig. 2.

COMPOSITION OF FRACTIONS OF AROMATIC HYDROCARBONS OF GENERATOR RESIN

Number	Compound	Content, % by weight	
		in aromatic concentrate	in resin
	Hydrocarbons:		
1	olefins	11.5	2.6
2	benzene derivatives	5.8	1.3
3	indane derivatives	11.7	2.6
	Aromatic hydrocarbons with condensed nuclei:		
4	binuclear	16.7	3.7
5	trinuclear	29.5	6.5
6	tetranuclear	10.2	2.3
7	pentanuclear	1.5	0.3
8	Oxygen-containing compounds	13.1	2.9
	Total	100.0	22.2

Analysis showed that generator resin contains a small amount of highly condensed compounds of an aromatic character. If trinuclear structures comprise 6.5% of the resin, tetra- and pentanuclear hydrocarbons — only 2.6%.

REFERENCES

1. Khyusse, Yu. Yu. Khimicheskaya kharakteristika vysshikh fraktsiy generatornoy smoly pribaltiyskogo slantsa (Chemical characteristics of higher fractions of generator resin of Baltic shale). Tartu, 1949.

2. Zelenin, N. I., V. S. Faynberg and K. B. Chernysheva. Khimiya i tekhnologiya slantsevoy smoly (Chemistry and technology of shale resin). Leningrad, 1968.

3. Eyzen, O. G. Combustible shales. Khimiya i tekhnologiya. 1961, No. 4, p. 213.

4. Lakhe, L. and O. Eyzen. Izv. AN ESSR. Khim. Geol., 1968, Vol. 17, No. 1, p.30.